

Claims

- [c1] 1. A gas distributing system for delivering gaseous reactant to a reaction chamber during a wafer fabrication process, comprising:
- a main gas distributing conduit branching out to a first gas distributing conduit and a second gas distributing conduit;
 - a first flow control valve along the first gas distributing conduit for controlling the gas flow rate inside the first gas distributing conduit;
 - a second flow control valve along the second gas distributing conduit for controlling the gas flow rate inside the second gas distributing conduit;
 - a top plate having a first gas nozzle at the outlet of the first gas distributing conduit, a second gas nozzle at the outlet of the second gas distributing conduit, and a gas barrier disposed in the top plate between the first gas nozzle and the second gas nozzle for preventing the mixing of gas from the first gas nozzle and the second gas nozzle; and
 - an upper electrode panel gas distributor having a first set of gas holes and a second set of gas holes thereon, wherein gas from the first gas nozzle passes into the re-

action chamber through the first set of gas holes and gas from the second gas nozzle passes into the reaction chamber through the second set of gas holes.

- [c2] 2. The gas distributing system of claim 1, wherein the system further includes a control system having:
a controller for adjusting the first flow control valve and the second flow control valve;
a first gas flow detector along the first gas distributing conduit for detecting the gas flow rate inside the first gas distributing conduit and sending back a signal corresponding to the detected gas flow rate to the controller; and
a second gas flow detector along the second gas distributing conduit for detecting the gas flow rate inside the second gas distributing conduit and sending back a signal corresponding to the detected gas flow rate to the controller.
- [c3] 3. The gas distributing system of claim 2, wherein the first gas flow detector comprises a heated coil, and the second gas flow detector comprises a heated coil.
- [c4] 4. The gas distributing system of claim 1, wherein the first flow control valve comprises a manually adjustable valve, and the second flow control valve comprises a manually adjustable valve.

- [c5] 5. The gas distributing system of claim 1, wherein the first gas nozzle is positioned somewhere near the central region of the upper electrode panel distributor, and the second gas nozzle is positioned somewhere near the peripheral region of the upper electrode panel distributor.
- [c6] 6. The gas distributing system of claim 1, wherein the gas barrier comprises an O-ring.
- [c7] 7. The gas distributing system of claim 6, wherein the O-ring is fabricated using a material comprising elastic material.
- [c8] 8. The gas distributing system of claim 6, wherein the O-ring is fabricated using a corrosion-resistant material.
- [c9] 9. The gas distributing system of claim 8, wherein the corrosion-resistant material comprises Teflon.
- [c10] 10. The gas distributing system of claim 1, wherein the first set of gas holes on the upper electrode panel distributor is evenly spaced.
- [c11] 11. The gas distributing system of claim 1, wherein the second set of gas holes on the upper electrode panel distributor is evenly spaced.
- [c12] 12. A method of distributing gaseous reactant to the re-

action chamber of a semiconductor wafer processing station, comprising the steps of:

- setting two gas flow rates inside a first and a second gas distributing conduits and two permissible deviation ratios of the two gas flow rates respectively;
- detecting the gas flow rates inside the first and the second gas distributing conduits and returning two signals corresponding to the gas flow rates to a control system respectively;
- computing two dynamic deviation ratios by comparing the gas flow rate inside the first and the second gas distributing conduits with the preset gas flow rates of both conduits respectively;
- comparing the dynamic deviation ratios of the first and the second gas distributing conduits with the permissible deviation ratios of both conduits respectively, and
- providing two control signals from the control system for informing the control valves on the first and the second gas distributing conduits to adjust the gas flow rates inside the first and the second gas distributing conduits.

[c13] 13. The method of claim 12, wherein the steps of providing two control signals from the control system for informing the control valves, if the dynamic deviation ratio of the first distributing conduit is positively greater than the permissible deviation ratio of that, the control

signal for informing the control valve on the first gas distributing conduit is to reduce the gas flow rate inside the first gas distributing conduit.

[c14] 14. The method of claim 12, wherein the steps of providing two control signals from the control system for informing the control valves, if the dynamic deviation ratio of the second distributing conduit is positively greater than the permissible deviation ratio of that, the control signal for informing the control valve on the second gas distributing conduit is to reduce the gas flow rate inside the second gas distributing conduit.

[c15] 15. The method of claim 12, wherein the steps of providing two control signals from the control system for informing the control valves, if the dynamic deviation ratio of the first distributing conduit is negatively greater than the permissible deviation ratio of that, the control signal for informing the control valve on the first gas distributing conduit is to increase the gas flow rate inside the first gas distributing conduit.

[c16] 16. The method of claim 12, wherein the steps of providing two control signals from the control system for informing the control valves, if the dynamic deviation ratio of the second distributing conduit is negatively greater than the permissible deviation ratio of that, the

control signal for informing the control valve on the second gas distributing conduit is to increase the gas flow rate inside the second gas distributing conduit.